

Claims

1 1. A method for determining parameters of a fluctuating stream of fluid
2 in a pipe using at least three electrodes (S1, E, S2) provided at the
3 periphery of the stream in spaced relationship to each other in the
4 direction of flow,

5 characterized in that

6 AC voltage signals (s_s) are fed to a first transmitting electrode
7 configuration located upstream (S1) and to a second transmitting
8 electrode configuration (S2) situated downstream thereof and signals (s_e)
9 received at a receiving electrode configuration (E) that is located between
10 the transmitting electrodes are registered by means of dielectric currents
11 and are subjected to a time-discrete cross correlation, from the results of
12 which the transit times of the fluctuations detected by the electrodes are
13 determined.

1 2. A method as defined in claim 1, characterized in that the AC voltage
2 signals (s_s) are fed to the transmitting electrode configurations (S1, S2) in
3 a temporally controlled manner and the cross correlation is carried out
4 implementing the profile of the temporal control of the transmitted
5 signals.

1 3. A method as defined in claim 1 or claim 2, characterized in that an
2 AC voltage signal (s_s) is alternately switched to the transmitting
3 electrodes.

1 4. A method as defined in any one of claims 1 to 3, characterized in
2 that the at least one first transmitting electrode configuration and/or the
3 at least one second transmitting electrode configuration has a plurality of
4 single electrodes ($S_{11}...S_{18}/S_{21}...S_{28}$) distributed around the periphery of the
5 stream.

1 5. A method as defined in any one of claims 1 to 4, characterized in
2 that two first transmitting electrode configurations and two second

3 transmitting electrode configurations are used (Fig. 8a).

1 6. A method as defined in any one of claims 1 to 5, characterized in
2 that a velocity-distribution profile is determined from the transit times of
3 the fluctuations between the electrodes by means of back projection.

1 7. A method as defined in any one of claims 1 to 6, characterized in
2 that the electrode configurations are provided on a flexible insulating
3 support material and that this material is disposed on the inner or outer
4 surface of a delivery pipe for the fluid.

1 8. A method as defined in any one of claims 1 to 7, characterized in
2 that a common external shield (SCH) is provided for the electrode
3 configurations.

1 9. A method as defined in any one of claims 1 to 8, characterized in
2 that the supply of the AC voltage signals (s_s) and the measurement of the
3 received signals (s_e) are carried out asymmetrically on a common ground.

1 10. A method as defined in any one of claims 1 to 9, characterized in
2 that at least one of the transmitting electrode configurations can be
3 shifted in position in an upstream/downstream direction relatively to the
4 receiving electrode configuration so that the relevant distance can be
5 adapted according to the amplitude of the resulting cross correlation value
6 to optimize the same to the conditions of flow.

1 11. A device for determining parameters of a fluctuating stream of fluid
2 in a pipe using at least three electrodes (S1, E, S2) provided at the
3 periphery of the stream in spaced relationship to each other in the
4 direction of flow,

5 characterized by

6 a first transmitting electrode configuration (S1) located upstream
7 and a second transmitting electrode configuration (S2) located
8 downstream, and a receiving electrode configuration (E) located between

9 the transmitting electrodes, these electrode configurations being provided
10 at the periphery of a stream of a fluid passing through a pipe,

11 and a receiving and evaluation device for detecting the received
12 signals (s_e) produced by dielectric currents, for carrying out a time-
13 discrete cross correlation and for determining the transit times of the
14 fluctuations detected by the electrodes from the cross correlation values.

1 12. A device as defined in claim 11, characterized in that a driver circuit
2 (AST) is provided for temporally controlled feeding of the AC voltage
3 signals (s_s) to the transmitting electrode configurations (S1, S2).

1 13. A device as defined in claim 11 or claim 12, characterized in that the
2 at least one first transmitting electrode configuration and/or at least one
3 second transmitting electrode configuration have/has a plurality of single
4 electrodes ($S_{11}...S_{18}/S_{21}...S_{28}$) distributed around the periphery of the
5 stream.

1 14. A device as defined in any one of claims 11 to 13, characterized in
2 that two first transmitting electrode configurations and two second
3 transmitting electrode configurations are provided (Fig. 8a).

1 15. A device as defined in any one of claims 11 to 14, characterized in
2 that the electrode configurations are provided on a flexible insulating
3 support material and that this material is situated on the inner or outer
4 surface of a delivery pipe for the fluid.

1 16. A device as defined in any one of claims 11 to 15, characterized in
2 that a common external shield (SCH) is provided for the electrode
3 configurations.

1 17. A device as defined in any one of claims 11 to 16, characterized in
2 that at least one of the transmitting electrode configurations is mounted
3 for displacement in the upstream/downstream direction relative to the
4 receiving electrode configuration.